

OSD

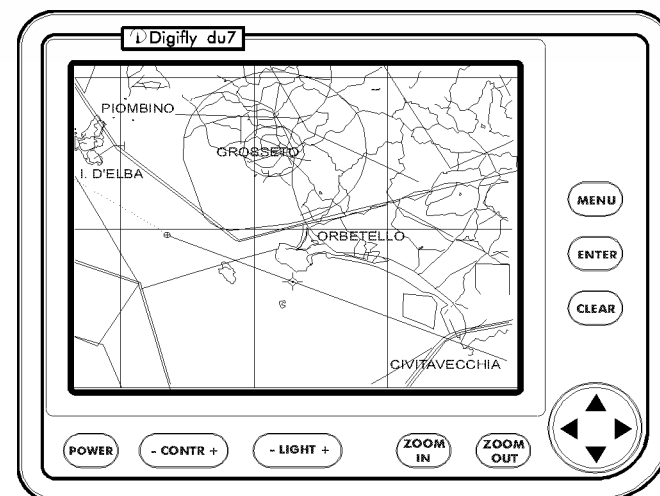
Open System Digifly

Display Unit 7

MOVING MAP

SW 2.02

USER MANUAL



DIGIFLY

5.2 - Technical features.

- Monochrome, high resolution 7", 320x240-pixel LCD, backlighted;
- Antiscratch protection;
- Contrast and brightness regulation;
- Lighted keyboard;
- Digifly OSD interface;
- External GPS interface (NMEA-0183 protocol);

MOVING MAP features

- 100 marks;
- *DST*, *BRG*, *TTG* to the cursor and to the destination (current waypoint);
- *GS*, *TRK* of the Aircraft;
- Power source: 10 to 28 VDC (0.4 ampere);
- Weight: 550 g.;

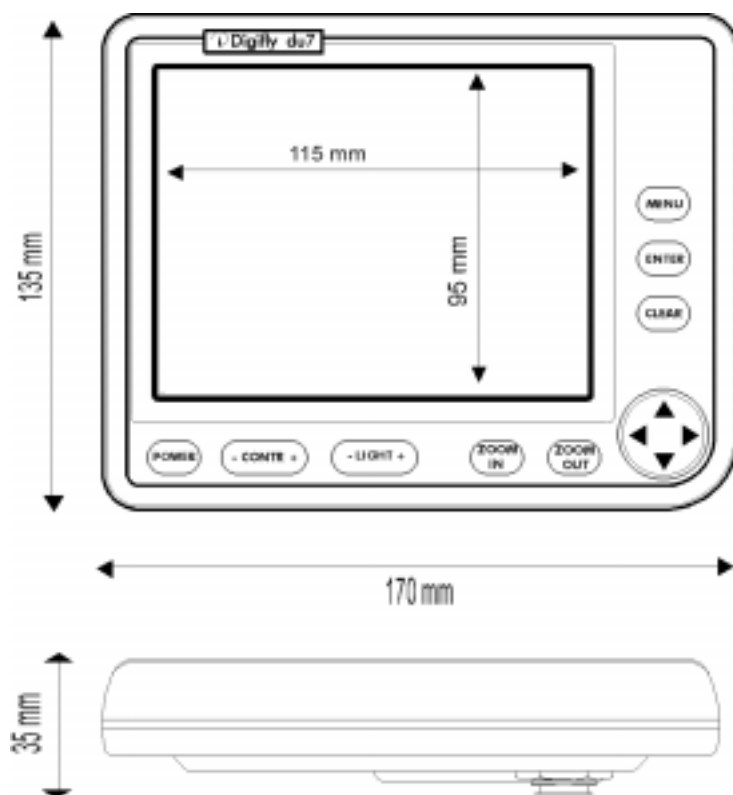


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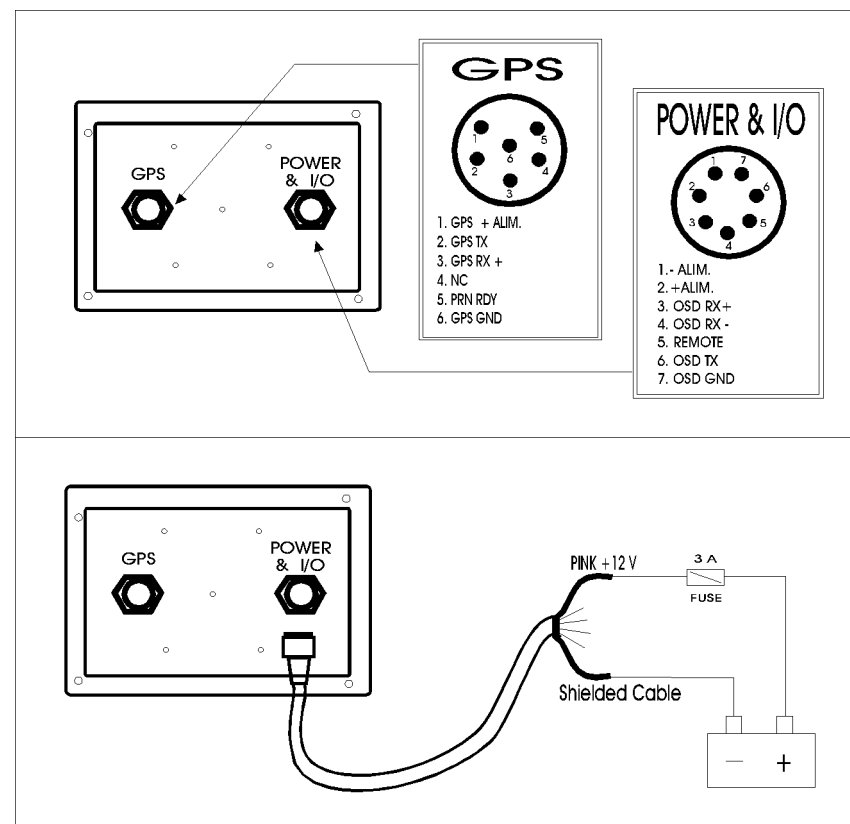
chapter 1 INTRODUCTION

The Moving Map navigation system makes navigation on electronic mapping extremely accurate in any environmental and light conditions.

The point obtained by the GPS is viewed directly on the electronic map together with information on speed, route, and time to destination. The system's graphic memory stores the latest 200 points of the track followed by the aircraft at user-defined intervals and waypoints associated to route legs. It is also possible to position marks and store them in memory. As for the electronic map contained in the data cartridge, it is possible to view a representation of all the useful elements contained in nautical and aeronautical maps with details, such as a port or airport, and also to view the desired cartographic elements. The system only accepts data contained in C-MAP cartridges. Therefore the Digifly Open System is now even more advanced and complete in order to meet any need of pilots and flight enthusiasts, significantly increasing the precision and safety standards supplied by the instruments presently available in the market.

NOTICE!!

The system is intended to be used only as an aid to navigation and in DAILY and NIGHT VFR flight conditions and does not substitute official navigation maps and documents, which are to be considered the primary and only reference source for any air-navigation activity.





chapter 5 INSTALLATION

5.1 - Electrical Wiring.

The system is composed by 3 elements:

- electronic instrument with GPS internal sensor;
- GPS antenna with related coaxial cable;
- C-MAP data cartridge.

The first point is acquired some minutes after the engine has been started, and subsequently the point is calculated every second.

The antenna must be placed so that it has the widest view of the sky possible, at least 1.5 mt from emitters.

The antenna can be equipped with a magnet for application on the appropriate support in the upper side of the instrument panel and/or a suction cup for application on the cabin's ceiling.

The C-MAP cartridge contains information on nautical and aeronautical VFR navigation and it must be inserted in the lower part of DU7.

The power source can vary from 10 to 28 Volt Vcc and it is drawn from the electric lighter socket in the aircraft equipped with it, or from an appropriate terminal block or portable battery.

The electrical input of the system is 0.4 ampere with backlighting and 0.25 ampere without backlighting.

The POWER SAVE function allows for further power saving.

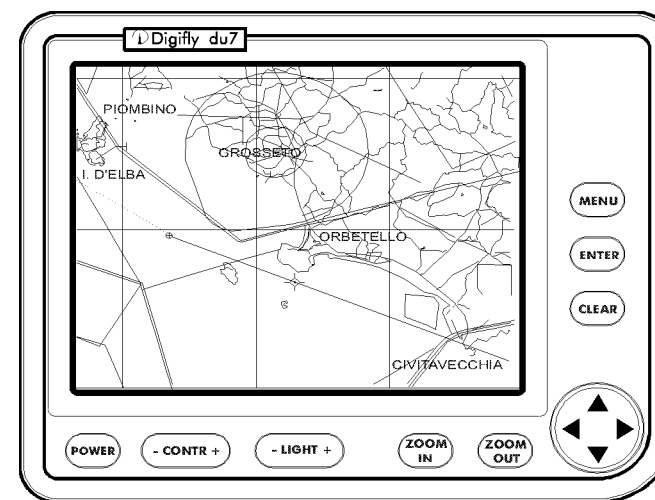
NOTICE!

To avoid dangerous transient states while turning on/off the aircraft engine, it is advised to power the GPS Box when the engine is in steady state and to turn it off before turning off the engine.



chapter 2 GETTING STARTED

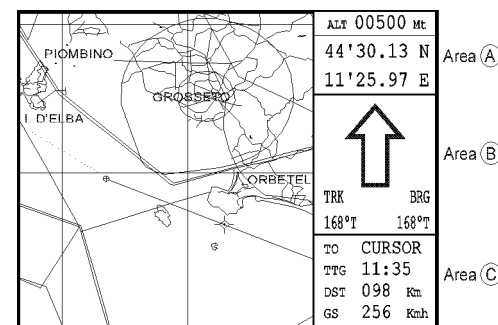
2.1 - Front panel.



2.2 - The display.

The transfective liquid crystal display (LCD) is divided into two sections:

- navigational data section;
- cartographic section;



2.2.1 - Navigational data section.

This section is divided into three areas: A, B and C (as illustrated in the previous figure);:

the area A contains :

- . aircraft altitude;
- . Lat/Lon co-ordinates of the position of the aircraft. This indication is blinking when the GPS acquisition is not correct. (see par. 3.4 Dead Reckoning function).

the area B contains :

- . ADF (Automatic Direction Finder) indicator.
- . True air bearing (BRG);
- . Destination in addition to True Route (TRK);

the area C contains :

- . Destination's name (CURSOR or *waypoint*)
 - . Ground speed of the aircraft (GS);
- To the destination:
- . Flight Time (TTG).
 - . Distance (DST);

2.2.2 - Cartographic section.

This part (on the left) of the screen displays:

- the electronic cartography ("North Up" oriented) with detail varying according to scale and C-MAP cartridge inserted;
- the position of the cursor (displayed as a );
- the position of the aircraft (displayed as a ) with a Course predictor, indicating the continuation of the true route, pulsing intermittently each time it receives a point from the GPS sensor;
- the track flight by the aircraft, made up of the latest 200 points at used-defined intervals. Such track is stored in memory also when the instrument is off;
- the position of the destination indicated by a Waypoint and connected to the aircraft position by means of a dotted line.



chapter 4 SYSTEM TEST

To enter in the System Test Page press and keep pressed the key **POWER** together with any other key. As soon as the key is released, the following menu will appear on the screen:

SYSTEM TEST (versione software)

CLEAR RAM

Pressing the **N - S ARROW** key, the desired entry will be selected. Activated it with the **E ARROW** key.

To return to normal functioning from each single test, it is necessary to turn the power off and on again.

1) CLEAR RAM

Selecting this function, it is possible to delete DU8's internal memory. A submenu will be displayed:

CLEAR SETTINGS
CLEAR DATABASE

prompting the user to confirm the deletion of all settings or all Data Base. Pressing the **E ARROW**, the function will be activated and the unit be resetted.

3.3.7 - PC Link.

The PC Link function allows the user to connect a computer to the DU7 to load/download Settings - Data Base - Routes - Track. The connection must be by a serial cable, the transmission must be at "9600 8 N 1". To exit press **MENU** then turn off the DU7.

3.4 - DEAD RECKONING Function.

The DEAD RECKONING function stores the last point acquired by the GPS in memory, in case the sensor stops transmitting data for some time, operating the cartographic plotter on the basis of the latest data acquired.

The user is notified by a beep sound each five (5) seconds and by the words DEAD RECKONING in the area A of the screen (see Cap.2).

Information on airports and radio-aids

When the cursor is positioned on an airport or radio-aid, a window is displayed on top of the screen, listing a summary of data from the Jeppesen database available in the data cartridge.

AIRPORT LIRP **SAN GIUSTO** Approach 122.10

To obtain more detailed data press the **ENTER** key.

See figures A, B, C and D to the following pages.

VHF **ELB**
LI **ELBA**
FREQ 114.70
VOR TACAN High No Voice
42° 43.84 N 010° 23.75 E
BRG ---°T DIST ----- Nm

ENTER - next page
MENU to exit

Figure (a)

VFR REPORT
VIAREGGIO 10 ←

42° 43.84 N 010° 23.75 E
BRG ---°T DIST ----- Nm

Overfly altitude
of reporting point
expressed in
Ft per 100

Figure (b)

INTERSECTION **SPEZI**
LI HI&LO Alt Awy
43° 46.64 N 009° 35.68 E
BRG ---°T DIST ----- Nm

Figure (c)

AIRPORT L I R P [LI]
 SAN GIUSTO
 CITY: PISA

Frequencies			
Approach	122.10	Tower	119.10
Approach	126.07	Tower	122.10
Ground	121.60		

FUEL: AVGAS JET
 Pattern MSL ---- Ft
 43° 41.02 N 010° 23.65 E
 Elevation 9 Ft
 BRG ---°T DIST ---- Nm

ENTER - next page
 MENU to exit

AIRPORT L I R P [LI]
 SAN GIUSTO
 CITY: PISA

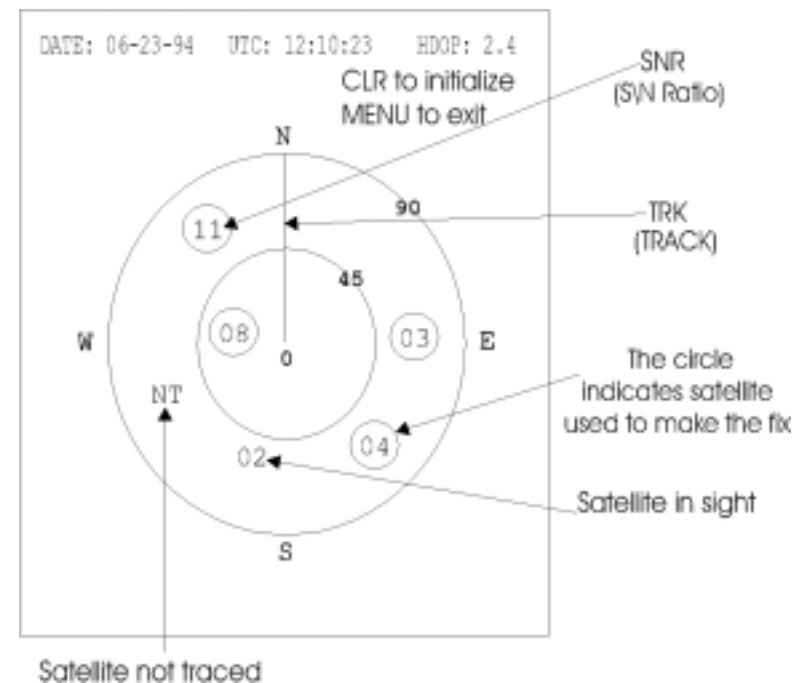
Frequencies			
Approach	122.10	Tower	119.10
Approach	126.07	Tower	122.10
Ground	121.60		

04L - 22R
 Surface ASPH
 Length 8192 Ft
 LIT
 BRG ---°T DIST ---- Nm

ENTER - next page
 MENU to exit

Inside this window are represented the airport runways.
 Left side data are pertinent to the blinking runway.
 To obtain other runway data press **ENTER** key.

Figure (d)



Press **CLEAR** to initialize the GPS. A window containing will appear at the bottom of the screen. In this window there are 4 data to send to the GPS for the initialization.

- . DATE (mm/dd/yy)
- . UTC (hh:mm:ss)
- . LAT
- . LON

Press the **ARROW KEYS** to change field.

Press **ENTER** to edit the current field and then to confirm.
MENU to exit.

UNITS SETTING - Allows the user to set the desired measure units.

DIST.	DISTANCE (Nm/Sm/Km).
ALT.	ALTITUDE (Ft/FL/Mt).
SPEED.	SPEED (Knt/Smh/Kmh)

Measure units are automatically updated in every other option.

TRACK SETUP

When it moves, the Fix leaves a track that remains in memory also when the instrument is off. The track is composed by a series of points; the TRACK SETUP option allows to set the track ON/OFF and to decide when (and where) the user wants to position a point of the track. In addition, the track can be viewed or hidden and reset.

FILL (ON/OFF)

- to fill or empty sea areas. The **E ARROW** key toggles this option on and off.

FTRES. FLIGHT TIME RESET

- to reset the Flight Time;

3.3.6 - GPS Page.

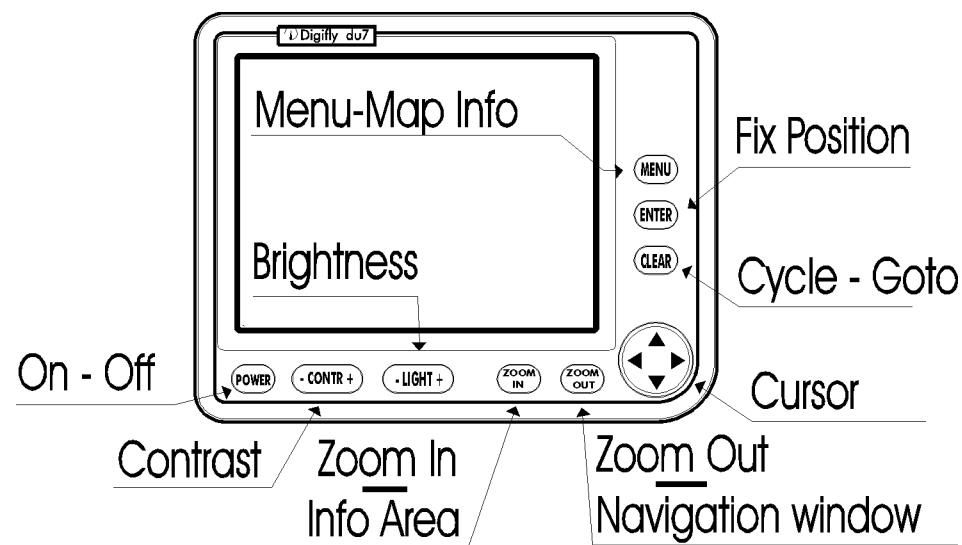
The GPS PAGE is graphical representation of satellite positions with respect to the observer that appears in the centre of the following figure. The satellites orbit around this observer. They are represented with a two-figure number (signal-noise ratio) ringed if the satellite is being used to determine the Fix, not ringed if it is just in sight, marked with NT if not traced.

The HDOP datum (Horizontal Dilution of Precision) indicates with a number the horizontal position of the satellites with respect to the observer. The highest this number, the fastest the data input by the GPS sensor.

The essential data from the GPS sensor connected to the instrument are viewed as follows. (See figure in the following page).

2.3 - The keyboard.

The activation of each function is signalled by a "Beep" sound. The keyboard perform the following functions:



2.3.1 - Turning on / off.

Before turning on the instrument make sure that all connections (described in the las chapter) were made correctly. Make sure the engine is turned on before the instrument. To turn on the DU7, press the **POWER** button. After a few seconds for the initial internal tests, the Moving Map is viewed. To turn off the DU7, press (and keep pressed for at least 2 seconds) the **POWER** button again.

2.3.2 - Contrast.

To regulate contrast press the **CONTR+/-** buttons.

2.3.3 - Brightness.

To regulate backlighting press the **LIGHT +/-** buttons. Each time the button is pressed, light will be increased.

2.3.5 - Basic functions.

The keys



- Move the cursor on the screen and position it on the desired point.
- The North (**N**) and South (**S**) arrow keys allow the user to select a function in any circumstance, while the East (**E**) arrow key allow the user to activate the selected function.

The key



- Gives access to all the system's functions.
- Opens a menu in the centre of the screen.
- Keep pressed for at least 1 sec. opens the Info Map window which contains the cartridge information, flight time and UTC.

The key



- Press this key to return to the fix position or to confirm the settings for the different options.

The key



- Gives access to more detailed cartographic representation, but showing a smaller area.
- Keep pressed for at least 1 sec. Gives access to additional information about controlled areas: position the cursor inside one of these areas and keep pressed the key **ZOOM IN**, on the top of the screen the information will appear. Move the cursor to exit.

CONTR. *CONTROLLED AREAS (ON/OFF/CYCLE)*

- To view or hide air traffic control areas;

RESTR. *RESTRICTIVE AREAS (ON/OFF/CYCLE)*

- To view or hide Forbidden, Controlled and Dangerous areas;
FIR (ON/OFF/CYCLE)

- To view or hide FIR boundaries;

MORA (ON/OFF/CYCLE)

- To view or hide Minimum Off Route Altitudes;

V.OBS. *VERTICAL OBSTRUCTIONS (ON/OFF/CYCLE)*

- To view or hide vertical obstructions;

Once an entry has been selected with the **N ARROW** or **S ARROW** keys, the **E ARROW** will toggle between the three following states:

ON - data are always present;

OFF - data are always absent;

CYCLE - data appear in sequence when the **CLEAR** key is used

To exit the VFR SETTING submenu, press the **MENU** key.

MARINE SETTING - Allows the user to select the following information:

AIDS. *NAVAL AIDS (ON/OFF/CYCLE)*

- To view or hide beacons;

COAST. *COASTAL FEATURES (ON/OFF/CYCLE)*

- To view or hide the coastal features;

REASTR. *RESTRICTIONS (ON/OFF/CYCLE)*

- To view or hide restrictions;

DEPTH. *DEPTH CONTOURS (ON/OFF/CYCLE)*

- To view or hide bathymetric lines;

NAMES (ON/OFF/CYCLE)

- To view or hide the names;

Once an entry has been selected with the **N ARROW** or **S ARROW** keys, the **E ARROW** will toggle between the three following states:

ON - data are always present;

OFF - data are always absent;

CYCLE - data appear in sequence when the **CLEAR** key is used

To exit the MARINE SETTING submenu, press the **MENU** key.

LAND SETTING -Allows the user to select the following information:

HIGH *HIGHWAY* (ON/OFF/CYCLE)

- To view or hide highways;

ROADS. *PRIM. AND SEC. ROADS* (ON/OFF/CYCLE)

- To view or hide main and secondary roads;

CONN. *ROADS CONNECTORS* (ON/OFF/CYCLE)

- To view or hide the connection roads within towns;

RAIL. *RAIL ROADS* (ON/OFF/CYCLE)

- To view or hide railroads;

POWER. *POWER LINE* (ON/OFF/CYCLE)

- To view or hide high voltage power lines;

RIVER. *RIVERS* (ON/OFF/CYCLE)

- To view or hide rivers;

BUILT. *BUILT UP AREAS* (ON/OFF/CYCLE)

- To view or hide the borders of town areas;

TRACK. *TRACK AND TRAILS* (ON/OFF/CYCLE)

- To view or hide paths and mule-tracks;

NAMES (ON/OFF/CYCLE)

- To view or hide place names.

Once an entry has been selected with the **N ARROW** or **S ARROW** keys, the **E ARROW** will toggle between the three following states;

ON - data are always present;

OFF - data are always absent;

CYCLE - data appear in sequence when the **CLEAR** key is used.

To exit the LAND SETTING submenu, press the **MENU** key.

VFR SETTING - Allows the user to select the following information:

AIRP. *AIRPORTS* (ON/OFF/CYCLE)

- To view or hide airports;

VOR (ON/OFF/CYCLE)

- To view or hide VOR stations;

NDB (ON/OFF/CYCLE)

- To view or hide NDB stations;

INTER. *INTERSECTIONS* (ON/OFF/CYCLE)

- To view or hide intersections in airway;

The Key



- Gives access to less detailed cartographic representation, but showing a larger area.
- Keep pressed for at least 1 sec. open/close the navigation window.

The Key



- Cycle function.
- Keep pressed for 1 second the key **CLEAR** to set the cursor position as the next waypoint (Go To function). The informations (Name - Lat/Lon - Altitude - Symbol) of this point will be put in the Data Base (if there is an Airport or VOR or NDB in this position the data will be get from the cartridge else the Name will be "MRKnnn" where "nnn" is a increasing number.



chapter 3 MOVING MAP

3.1 - Cartographic Symbols

An excessive amount of data on the monochrome screen could result in poor understanding of the information represented on it.

Therefore the graphic representation of symbols has been simplified as follows:

- Aeronautical control areas are depicted as dotted lines with letters indicating the types of areas:

-----F-----	= FIR,
-----T-----	= TMA,
-----C-----	= CTR,
-----A-----	= ATZ.

- The areas liable of Restrictions (Forbidden, Controlled and Dangerous) are depicted as dotted lines alternating with R letters;

.....R.....

- The compulsory VFR routes are depicted as continuous lines and relative Intersections;



- Intersections are depicted as ;

- Surfaces for ULM indicated with an empty circle ;

- The sector minimum altitudes (MEF) are in Feet (Ft)

as follows:  = 3700 feet;

- Airports shorter than 900 m indicated with a ring ;

- Airports longer than 900 m indicated with a full circle ;

The circles contain information on the orientation of the main runway



In addition, the information selected with the cursor on the different elements are automatically displayed in a window which appears on the screen.

NAME	LAT 45°27.68 N	ALT Ft 00000
MILAN	LON 009°16.50 E	SYM ▲

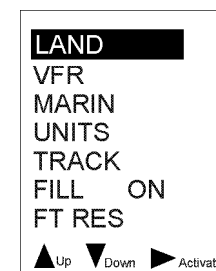
ADD MARK - To position and store User Marks. Select and activate the ADD MARK option. A small window will be displayed in the bottom left-hand corner of the screen, containing the LAT/LON data for the Mark. The cursor will be placed on the screen for the user to move it on the point to be stored. Press the **ENTER** key to confirm.

DELETE MARK - To delete any User Mark. Select and activate the DELETE MARK option; a small pair of scissors with a point will be displayed on the screen. Place the scissors with the point on the Mark you want to delete. Press the **ENTER** key to confirm.

MODIFY MARK - To modify any User Mark. Select and activate the MODIFY MARK option. Place the cursor with the point on the Mark you want to modify. Press the **ENTER** key to confirm.

3.3.5 - Set Up.

Allows the user to define the different settings of the cartographic plotter..



From now ,

UP - DOWN ARROW to edit the current character.

LEFT - RIGHT ARROW to move left right inside the current field.

ENTER to confirm.

ZOOM IN to previous field.

MENU to escape.

When the field is correct press **ENTER**, so the "editing" goes to the next field (LAT).

NAME	LAT	ALT Ft
MILAN	00°00.00 S	-----
	LON	SYM
	--- --.--- -	-

When the Latitude and then the Longitude is correct press **ENTER**.

NAME	LAT	ALT Ft
MILAN	45°27.68 N	00000
	LON	SYM
	009°16.50 E	-

When the altitude is correct (-1000/+32000 Ft) press **ENTER**.

NAME	LAT	ALT Ft
MILAN	45°27.68 N	00000
	LON	SYM
	009°16.50 E	□

When the symbol is correct press **ENTER** to confirm all the data inserted/edited. The data window will be as below.

Such information are the height of obstacles, data on control areas, on restricted areas and on radio aids.

3.2 - General symbols.

There are different symbols used for the management of the system, according to their functions.

- Cursor  ;
- Cursor associated with the MARK Positioning function  ;
- Different types of Marks: ●, ■, ▲;
- Deletion of Marks  ;
- Aircraft position:  .

3.3 - Main menu.

It's a window in the center of the screen with the following submenues.

UP-DOWN ARROW key to select a function inside a menu.

RIGHT ARROW key to activate the function.

GO TO
SAVE FIX
NEAREST
DATABASE
SETTINGS
SETUP
GPS PAGE
PC LINK
▲ Up ▼ Down ► Activate

3.3.1 - Go To.

This function allows the user to scroll the Data Base to select the position (previously stored) as the next waypoint. When is activated this function, in the screen appear the following window.

NAME	LAT	ALT Ft
-----	-- -- , -- --	-----
	LON	SYM
	-- -- , -- --	-

UP - DOWN ARROW to scroll the Data Base.

ENTER to select a valid User Mark.

RIGHT ARROW in the empty (-----) position to add an User Mark.

MENU to escape.

The procedure to add an User Mark is described in the par. 3.3.4 (*How to add or edit an User Mark*).

3.3.2 - Save Fix.

Allows the user to save in the Data Base the aircraft position.

3.3.3 - Nearest.

Allows to view a list of the interest points closest to the Fix;

NEAREST
Airports
VOR
NDB
Intersections
USER MARKS
▲ Up ▼ Down ► Activate

Selecting and activating the desired option (Airports, VOR, etc.) the instrument will display a window with information on BRG, DIST and TTG regarding the selection of points closest to the Fix.

Selecting a point will be activated the Go To function with this position.

3.3.4 - Data Base.

Allows the user to position points of particular interest on the map.

DATABASE
DATA TABLE
ADD MARK
DELETE MARK
MODIFY MARK
MENU to exit
▲ Up ▼ Down ► Activate

DATA TABLE - To handle the Data Base (add - delete - modify). Will be appear the following window.

NAME	LAT	ALT Ft
-----	-- -- , -- --	-----
	LON	SYM
	-- -- , -- --	-

UP - DOWN ARROW to scroll the Data Base.

RIGHT ARROW to edit or add (in empty pos.) an User Mark.

CLEAR to delete an User Mark.

MENU to escape.

How to add or edit an User Mark.

Once inside the Data Base window (as above), select the User Mark to edit. If you want add an User Mark select the empty position (-----). Press **RIGHT ARROW**. The window became so:

NAME	LAT	ALT Ft
A	-- -- , -- --	-----
	LON	SYM
	-- -- , -- --	-